

## PATENT COOPERATION TREATY

## PCT

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 49549-54232	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/SE98/02386	International filing date ( <i>day month year</i> ) 18.12.1998	Priority date ( <i>day month year</i> ) 19.12.1997
International Patent Classification (IPC) or national classification and IPC <sub>7</sub> A01J 5/017, G07C 3/00		
Applicant Alfa Laval Agri AB et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 3 sheets, including this cover sheet.

☐ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 2 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand  07.07.1999	Date of completion of this report  29.03.2000
Name and mailing address of the IPEA/SE Patent- och registreringsverket Box 5055 S-102 42 STOCKHOLM Facsimile No. 08-667 72 88	Authorized officer  Magnus Thorén/AB Telephone No. 08-782 25 00

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/SE98/02386

**I. Basis of the report**

1. This report has been drawn on the basis of *(Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.)*:

- ☐ the international application as originally filed.
- ☒ the description, pages 1 - 7, as originally filed,  
pages \_\_\_\_\_, filed with the demand,  
pages \_\_\_\_\_, filed with the letter of \_\_\_\_\_,  
pages \_\_\_\_\_, filed with the letter of \_\_\_\_\_.
- ☒ the claims, Nos. \_\_\_\_\_, as originally filed,  
Nos. \_\_\_\_\_, as amended under Article 19,  
Nos. \_\_\_\_\_, filed with the demand,  
Nos. 1 - 10, filed with the letter of 04.01.2000,  
Nos. \_\_\_\_\_, filed with the letter of \_\_\_\_\_.
- ☒ the drawings, sheets/fig 1 - 3, as originally filed,  
sheets/fig \_\_\_\_\_, filed with the demand  
sheets/fig \_\_\_\_\_, filed with the letter of \_\_\_\_\_,  
sheets/fig \_\_\_\_\_, filed with the letter of \_\_\_\_\_.

2. The amendments have resulted in the cancellation of:

- ☐ the description, pages \_\_\_\_\_
- ☐ the claims, Nos. \_\_\_\_\_
- ☐ the drawings, sheets/fig \_\_\_\_\_

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the supplemental Box (Rule 70.2(c)).

4. Additional observations, if necessary:

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/SE98/02386

**V. Resoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement****1. Statement**

Novelty (N)	Claims	<u>1-10</u>	YES
	Claims		NO
Inventive step (IS)	Claims	<u>1-10</u>	YES
	Claims		NO
Industrial applicability (IA)	Claims	<u>1-10</u>	YES
	Claims		NO

**2. Citations and explanations**

Amended claims have been issued.

The present invention relates to a milking robot or the like, associated with control means, and comprising a robot arm. A registering means is provided for registering a cumulative running value. The control means generates a signal when a preset threshold value is reached. The threshold value is set for an animal related device.

The cited WO 96/36212 reveals that the teat cup liners are to be replaced when a predetermined time has elapsed.

It may not be considered obvious to apply this technology to a milking robot.

The invention according to the amended claims may be considered novel.

The invention is industrially applicable.

## PATENT COOPERATION TREATY

PCT

## NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Assistant Commissioner for Patents  
United States Patent and Trademark  
Office  
Box PCT  
Washington, D.C.20231  
ÉTATS-UNIS D'AMÉRIQUE

in its capacity as elected Office

Date of mailing (day/month/year) 23 August 1999 (23.08.99)	
International application No. PCT/SE98/02386	Applicant's or agent's file reference 49549-54232
International filing date (day/month/year) 18 December 1998 (18.12.98)	Priority date (day/month/year) 19 December 1997 (19.12.97)
Applicant ERIKSSON, Jan	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:

07 July 1999 (07.07.99)

☐ in a notice effecting later election filed with the International Bureau on:2. The election ☒ was☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO  
34, chemin des Colombettes  
1211 Geneva 20, Switzerland

Facsimile No.: (41-22) 740.14.35

Authorized officer

Marie-José Devillard

Telephone No.: (41-22) 338.83.38

## PATENT COOPERATION TREATY

## PCT

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

REC'D 19 APR 2000

WIPO PCT

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Applicant's or agent's file reference 49549-54232	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/SE98/02386	International filing date (day month year) 18.12.1998	Priority date (day month year) 19.12.1997
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2. This REPORT consists of a total of <u>3</u> sheets, including this cover sheet.  <input type="checkbox"/> This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).  These annexes consist of a total of <u>2</u> sheets.
3. This report contains indications relating to the following items:  I <input checked="" type="checkbox"/> Basis of the report II <input type="checkbox"/> Priority III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability IV <input type="checkbox"/> Lack of unity of invention V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement VI <input type="checkbox"/> Certain documents cited VII <input type="checkbox"/> Certain defects in the international application VIII <input type="checkbox"/> Certain observations on the international application

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## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

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Industrial applicability (IA)	Claims	<u>1-10</u>	YES
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It may not be considered obvious to apply this technology to a milking robot.

The invention according to the amended claims may be considered novel.

The invention is industrially applicable.

# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/SE98/02386

## I. Basis of the report

1. This report has been drawn on the basis of (Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.):

- ☐ the international application as originally filed.
- ☒ the description, pages 1-7, as originally filed,  
 pages \_\_\_\_\_, filed with the demand,  
 pages \_\_\_\_\_, filed with the letter of \_\_\_\_\_,  
 pages \_\_\_\_\_, filed with the letter of \_\_\_\_\_.
- ☒ the claims, Nos. \_\_\_\_\_, as originally filed,  
 Nos. \_\_\_\_\_, as amended under Article 19.  
 Nos. \_\_\_\_\_, filed with the demand,  
 Nos. 1-10, filed with the letter of 04.01.2000,  
 Nos. \_\_\_\_\_, filed with the letter of \_\_\_\_\_.
- ☒ the drawings, sheets/fig 1-3, as originally filed,  
 sheets/fig \_\_\_\_\_, filed with the demand  
 sheets/fig \_\_\_\_\_, filed with the letter of \_\_\_\_\_,  
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3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the supplemental Box (Rule 70.2(c)).

4. Additional observations, if necessary:

## CLAIMS

1. An animal related apparatus, comprising a robot (6) for performing an animal related operation, said robot being associated with a control means (23), and at least one animal related device (12a, 12b) associated with said control means, said robot being provided with a robot arm (8) adapted to move said animal related device towards an animal, characterised in that a registering means (20a, 20b, ... , 20g) is provided for registering a cumulative running value, said control means being adapted to generate a signal when a predetermined threshold value has been reached.
2. An apparatus according to claim 1, wherein said registering means (20a, 20b, ... , 20g) is adapted to register the running value of said at least one animal related device.
3. An apparatus according to claim 1 or 2, wherein said registering means (20a, 20b, ... , 20g) is adapted to register the running value of a driving means (22) of said robot (6).
4. An apparatus according to anyone of claims 1 to 3, wherein said running value is the running time of a complete animal related operation.
5. An apparatus according to anyone of claims 1 to 4, wherein said predetermined threshold value is set for each of said at least one animal related device, said robot and said complete animal related operation.
6. An apparatus according to anyone of the preceding claims, wherein said animal related device comprises milking equipment having a teatcup (12a) provided with a shell and a liner forming an intermediate space, said space being connectible to a source of vacuum (24) via a pulsator (26) for creating a pulsating vacuum, said pul-



sator being associated with said control means (23), said control means being adapted to register the cumulative running value of said pulsator.

5 7. An apparatus according to claim 6, wherein said running value is running time of said pulsator (26).

8. An apparatus according to claim 6 or 7, wherein said running value is a number of pulsations generated by said pulsator (26).

10 9. An apparatus according to anyone of the preceding claims, wherein said animal related device comprises a teat location device (14), said running value being running time thereof.

15 10. An apparatus according to anyone of the preceding claims, wherein said animal related device comprises a teat cleaning device (12b), said running value being running time thereof.

20 11. An apparatus according to anyone of the preceding claims, wherein said apparatus further comprises a gate means (18) for restricting movement of an animal from an animal space (4), said gate means (18) being opened and closed by means of a driving means (19), said running value being said running time of said driving means.

## PATENT COOPERATION TREATY

PCT

NOTIFICATION OF THE RECORDING  
OF A CHANGE(PCT Rule 92bis.1 and  
Administrative Instructions, Section 422)

From the INTERNATIONAL BUREAU

To:

PLATT, T.  
Albihns Patentbyrå Stockholm AB  
P.O. Box 5581  
S-114 85 Stockholm  
SUÈDE

Date of mailing (day/month/year)

29 May 2000 (29.05.00)

Applicant's or agent's file reference

49549-54232

International application No.

PCT/SE98/02386

## IMPORTANT NOTIFICATION

International filing date (day/month/year)

18 December 1998 (18.12.98)

1. The following indications appeared on record concerning:



the applicant



the inventor



the agent



the common representative

Name and Address

ALFA LAVAL AGRI AB  
P.O. Box 39  
S-147 21 Tumba  
Sweden

State of Nationality

SE

State of Residence

SE

Telephone No.

Facsimile No.

Teleprinter No.

2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:



the person



the name



the address



the nationality



the residence

Name and Address

DELAVAL HOLDING AB  
P.O. Box 39  
S-147 21 Tumba  
Sweden

State of Nationality

SE

State of Residence

SE

Telephone No.

Facsimile No.

Teleprinter No.

3. Further observations, if necessary:

4. A copy of this notification has been sent to:



the receiving Office



the International Searching Authority



the International Preliminary Examining Authority



the designated Offices concerned



the elected Offices concerned



other:

The International Bureau of WIPO  
34, chemin des Colombettes  
1211 Geneva 20, Switzerland

Facsimile No.: (41-22) 740.14.35

Authorized officer

A. Karkachi

Telephone No.: (41-22) 338.83.38



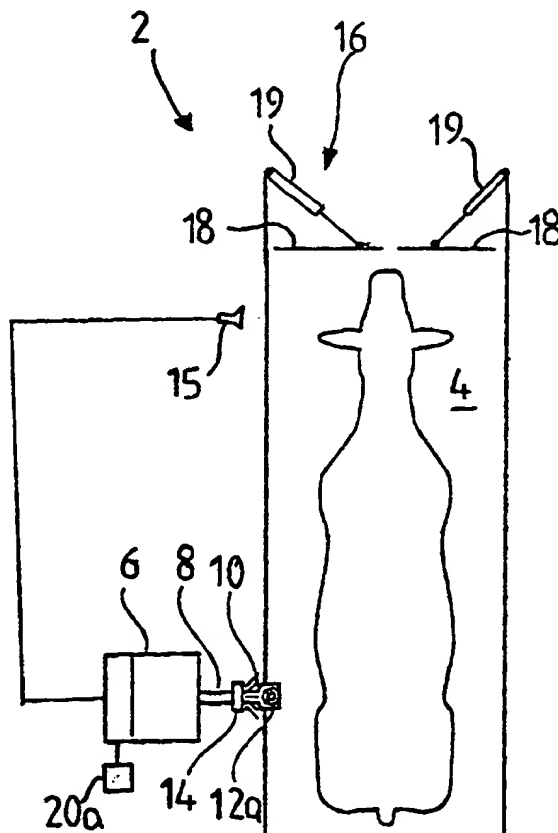
## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification <sup>6</sup> : <b>A01J 5/017, G07C 3/00</b>		<b>A1</b>	(11) International Publication Number: <b>WO 99/31967</b>
			(43) International Publication Date: 1 July 1999 (01.07.99)
(21) International Application Number: PCT/SE98/02386 (22) International Filing Date: 18 December 1998 (18.12.98) (30) Priority Data: 9704780-7                      19 December 1997 (19.12.97)      SE (71) Applicant (for all designated States except US): ALFA LAVAL AGRI AB [SE/SE]; P.O. Box 39, S-147 21 Tumba (SE). (72) Inventor; and (75) Inventor/Applicant (for US only): ERIKSSON, Jan [SE/SE]; Crusebjörns väg 23, S-147 63 Uttran (SE). (74) Agents: PLATT, T. et al.; Albihns Patentbyrå Stockholm AB, P.O. Box 5581, S-114 85 Stockholm (SE).		(81) Designated States: AL, AM, AT, AT (Utility model), AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, CZ (Utility model), DE, DE (Utility model), DK, DK (Utility model), EE, EE (Utility model), ES, FI, FI (Utility model), GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SK (Utility model), SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).  <b>Published</b> With international search report.	

(54) Title: AN ANIMAL RELATED APPARATUS

## (57) Abstract

An animal related apparatus comprises a robot (6) for performing an animal related operation, said robot being associated with a control means, and at least one animal related device (12a) associated with said control means, said robot being provided with a robot arm (8) adapted to move said animal related device towards an animal. According to the invention, a registering means (20a) is provided for registering a cumulative running value, said control means being adapted to generate a signal when a predetermined threshold value has been reached.



**FOR THE PURPOSES OF INFORMATION ONLY**

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DK	Denmark	LR	Liberia	SG	Singapore		
EE	Estonia						

An animal related apparatus

## TECHNICAL BACKGROUND

5 The present invention relates to an animal related apparatus, comprising a robot for performing an animal related operation, said robot being associated with a control means, and at least one animal related device associated with said control means, said robot being provided with a robot arm adapted to move said animal related device towards an animal.

10

Such an apparatus is known from WO 97/15900, which document describes a milking robot for performing i.a. automatic attachment of teatcups onto the teats of an animal. However, the therein described apparatus needs regular maintenance.

## 15 OBJECT OF THE INVENTION

It is an object of the invention to provide an improved apparatus, which needs less maintenance.

## 20 SUMMARY OF THE INVENTION

This object has been achieved by the apparatus of the initially defined kind, which is characterised in that a registering means is provided for registering a cumulative running value, said control means being adapted to generate a signal when a prede-

25 terminated threshold value has been reached.

In particular, said registering means is adapted to register the running value of said at least one animal related device.

30 Alternatively, or additionally said registering means is adapted to register the running value of a driving means of said robot.

Preferably, said running value is the running time of a complete animal related operation.

5 Hereby, it is established by the control means when maintenance is needed regarding the whole apparatus.

Suitably, said predetermined threshold value is set for each of said at least one animal related device, said robot and said complete animal related operation. Hereby, it  
10 is possible in advance to set a running value outgoing e.g. from wear or health requirements.

Preferably, said animal related device comprises milking equipment having a teat-cup provided with a shell and a liner forming an intermediate space, said space being  
15 connectible to a source of vacuum via a pulsator for creating a pulsating vacuum, said pulsator being associated with said control means, said control means being adapted to register the cumulative running value of said pulsator.

In particular, said running value is running time of said pulsator. Alternatively, or  
20 additionally, said running value is a number of pulsations generated by said pulsator. Hereby, it is possible to establish when the liner needs to be exchanged.

Suitably, said animal related device comprises a teat location device, said running value being running time thereof. Hereby, it is possible to establish when the teat  
25 location device needs adjustment.

Preferably, said animal related device comprises a teat cleaning device, said running value being running time thereof. Hereby, it is possible to establish when the teat  
cleaning device needs thorough cleaning.

Suitably, said apparatus further comprises a gate means for restricting movement of an animal from an animal space, said gate means being opened and closed by means of a driving means, said running value being said running time of said driving means. Hereby, it is possible to establish when the gate means needs to be serviced.

5

## DRAWING SUMMARY

In the following, the invention will be described in more detail with reference to the accompanying drawings, in which

10

Figure 1 is a top view of the apparatus according to the invention,

Figure 2 is a schematic view of components of the apparatus shown in figure 1

15

Figure 3 is a schematic view of further components of the apparatus.

## DETAILED DESCRIPTION

20

Figure 1 shows an apparatus 1 for performing an animal related operation comprising an animal space 4. A robot 6 is provided with a robot arm 8, which is movable into the animal space 4. The robot arm is, in turn, provided with a gripper 10 for gripping an animal related apparatus, in the figure shown as a teatcup 12a, and an image capturing device 14 for controlling the movement of the robot arm. Alternatively, a laser sensor or an ultrasonic sensor is provided for this purpose.

25

An sensor 15, e.g. an image capturing device, a laser sensor or an ultrasonic sensor is provided for indicating the presence of an animal in the animal space 4. The sensor is associated with the robot 6.

Furthermore, the animal space 4 is delimited i.a. by means of a gate means 16, comprising a pair of gate members 18, each being provided with a driving means 19 in the form of a pneumatic or hydraulic cylinder.

5 The robot 6 is provided with a control means 23 (see figure 2), which i.a. controls the movement of the robot arm 8, selects the kind of animal related apparatus to be utilised and opens and closes the gates 18. Furthermore, a registering means 20a in the form of a timer is provided for registering the length of a complete animal related operation, such as teat cleaning with subsequent milking.

10

Figure 2 shows schematically the apparatus of figure 1 in more detail. The robot arm 8 grips the teatcup 12a by means of the gripper 10. The robot arm 8 with image capturing device 14 is moved towards a teat 21a of the udder 21b of an animal to be milked by means of a driving means in the form of pneumatic or hydraulic cylinders 15 22 associated with said control means 23.

15

The teatcup 12a is of the generally known kind, comprising a shell and a liner forming an intermediate space, which is connected to a source of vacuum via a pulsator 26. The interior of the liner is connected (not shown) to a milking vacuum created by the vacuum source 24. 20

20

Each cylinder 22 is provided with a registering means 20b in the form of a timer, which registers the running time of the cylinders 22. Furthermore, the image capturing device 14 and the vacuum source 24 are provided with such registering means 25 20c, 20d, that register the running time thereof, respectively.

25

The pulsator 26 is also provided with a registering means 20e, however either in the form of a timer, which measures the running time of the pulsator, or a pulsation counter, which counts the number of pulsations generated by the pulsator 26.

30



There may be provided one pulsator 26 for all the teatcups 12a (only one shown in the figure, but there is of course one teatcup provided for each teat to be milked) or one pulsator for each teatcup 12a. In the latter case, there is provided one registering means 20e per pulsator 26

5

Figure 3 shows schematically the same robot arm as in figure 2, however with another animal related device in the gripper, namely a teat cleaning device 12b, which is provided with a driving means, which performs a counter rotating movement of a pair of circular cylindrical brushes. The driving means is associated with a registering means 20f in the form of a timer, which measures the running time of the driving means.

10

Furthermore, the driving means 19 of the gate members 18 are connected to a registering means 20g, which measures the running time of the cylinders 19.

15

## OPERATION

An animal related operation is started when an animal has entered the animal space 4, which is sensed by the animal presence sensor 15, and is an indication for the start of an animal related operation.

20

The driving means 22 of the robot arm 8 are started and the teat cleaning device 12b is moved towards the teats 21a of the animal, which teats are located by starting the image capturing device 14. The driving means of the teat cleaning device 12b is started and the teat is introduced between the rotating brushes.

25

The cleaning operation is repeated for all the teats of the udder 21b.

After performed cleaning, the driving means of the teat cleaning device 12b is stopped. The running time thereof is registered in the registering means 20f.

30

The robot arm 8 returns the teat cleaning device 12b to a rack (not shown) and fetches a teatcup 12a and moves it towards a selected teat 21a, which is located by means of the image capturing device 14.

5

While attaching the teatcup 12a onto the teat 21a, the interior of the liner is subjected to a milking vacuum, which causes the teatcup to stay attached on the teat. Furthermore, the pulsator 26 is started and the intermediate space is subjected to a pulsating vacuum.

10

The sequence is repeated until all the teatcups 12a are attached to the rest of the teats, the number depending on the kind of milked animal. The robot arm 8 is returned to a rest position and its driving means 22 is turned off. The running time of the cylinders 22 and the image capturing device 14 is registered.

15

After finished milking, the pulsator 26 is shut off and the running time and/or the number of pulsations are registered by the timer 20e. A teat retracting means (not shown) e.g. in the form of a pneumatic motor provided with a rope connected to a teatcup, detaches the teatcup and returns it to a storage position. Of course, also the teatcup retracting means may be provided with a registering means.

20

The gates 18 are now opened, by starting the cylinders 19, for allowing the animal to leave the animal space 4. The gates are closed and the cylinders are turned off. The running time thereof is registered.

25

The closing of the gates 19 is also an end signal for the whole animal related operation. The timer 20a thus registers the time lapsed between the initial sensed presence of the animal by the sensor 15 and the closing of the gates 19.

30

Each time an animal related operation is performed, each registering means 20a, 20b etc. is started and the registered value is added to the already registered from previ-

ously performed animal related operations, if any. Accordingly, a memory is provided for accumulating such values.

5 The control means 23 is preferably set with a maximum running time of each component 19, 22 etc. or a maximum number of pulsations of the pulsator 26, before the control means generates a signal that service has to be performed regarding that component or the whole apparatus. As an example, the control means generates a signal when a teatcup liner must be exchanged, outgoing from a maximum running time of the pulsator or a maximum number of pulsations thereof., the maximum  
10 time constituting a threshold value.

It should be noted that the vacuum source 24 may be allowed to run continuously or to be stopped after each finished milking. In each case, the running time thereof is registered.

15 It should also be noted that the present invention also relates to robot arms with a plurality of teatcups arranged thereon.

Furthermore, a gate means may be provided also as entrance gate into the animal  
20 space. Of course, also the driving means of such gates are provided with a registering means.

Also other kinds of teat cleaning devices may be used, such as a teat rinsing cup, in which case the running time of the introduced rinsing fluid is registered.

25 The invention relates to all kinds of milking animals, such as cows, sheep, goats, horses and buffaloes.

## CLAIMS

1. An animal related apparatus, comprising a robot (6) for performing an animal related operation, said robot being associated with a control means (23), and at least  
5 one animal related device (12a, 12b) associated with said control means, said robot being provided with a robot arm (8) adapted to move said animal related device towards an animal, **characterised in that**  
a registering means (20a, 20b, ... , 20g) is provided for registering a cumulative running value, said control means being adapted to generate a signal when a prede-  
10 termined threshold value has been reached.
2. An apparatus according to claim 1, wherein said registering means (20a, 20b, ... , 20g) is adapted to register the running value of said at least one animal related de-  
vice.
- 15 3. An apparatus according to claim 1 or 2, wherein said registering means (20a, 20b, ... , 20g) is adapted to register the running value of a driving means (22) of said robot (6).
- 20 4. An apparatus according to anyone of claims 1 to 3, wherein said running value is the running time of a complete animal related operation.
5. An apparatus according to anyone of claims 1 to 4, wherein said predetermined threshold value is set for each of said at least one animal related device, said robot  
25 and said complete animal related operation.
6. An apparatus according to anyone of the preceding claims, wherein said animal related device comprises milking equipment having a teatcup (12a) provided with a shell and a liner forming an intermediate space, said space being connectible to a  
30 source of vacuum (24) via a pulsator (26) for creating a pulsating vacuum, said pul-

sator being associated with said control means (23), said control means being adapted to register the cumulative running value of said pulsator.

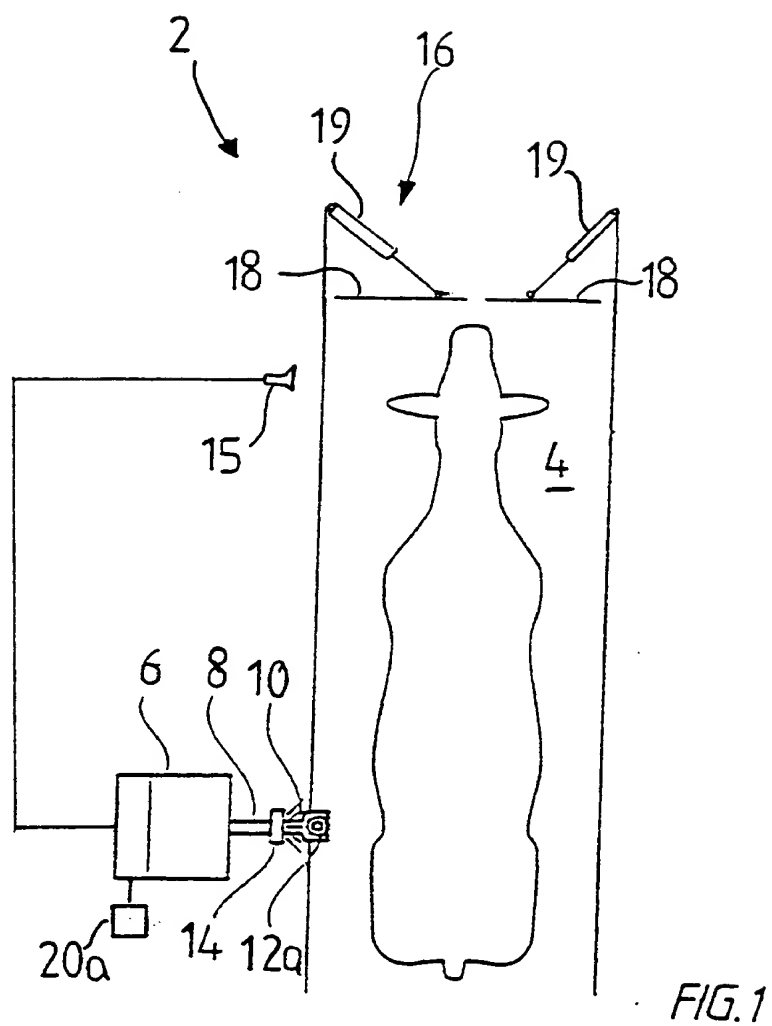
5 7. An apparatus according to claim 6, wherein said running value is running time of said pulsator (26).

8. An apparatus according to claim 6 or 7, wherein said running value is a number of pulsations generated by said pulsator (26).

10 9. An apparatus according to anyone of the preceding claims, wherein said animal related device comprises a teat location device (14), said running value being running time thereof.

15 10. An apparatus according to anyone of the preceding claims, wherein said animal related device comprises a teat cleaning device (12b), said running value being running time thereof.

20 11. An apparatus according to anyone of the preceding claims, wherein said apparatus further comprises a gate means (18) for restricting movement of an animal from an animal space (4), said gate means (18) being opened and closed by means of a driving means (19), said running value being said running time of said driving means.



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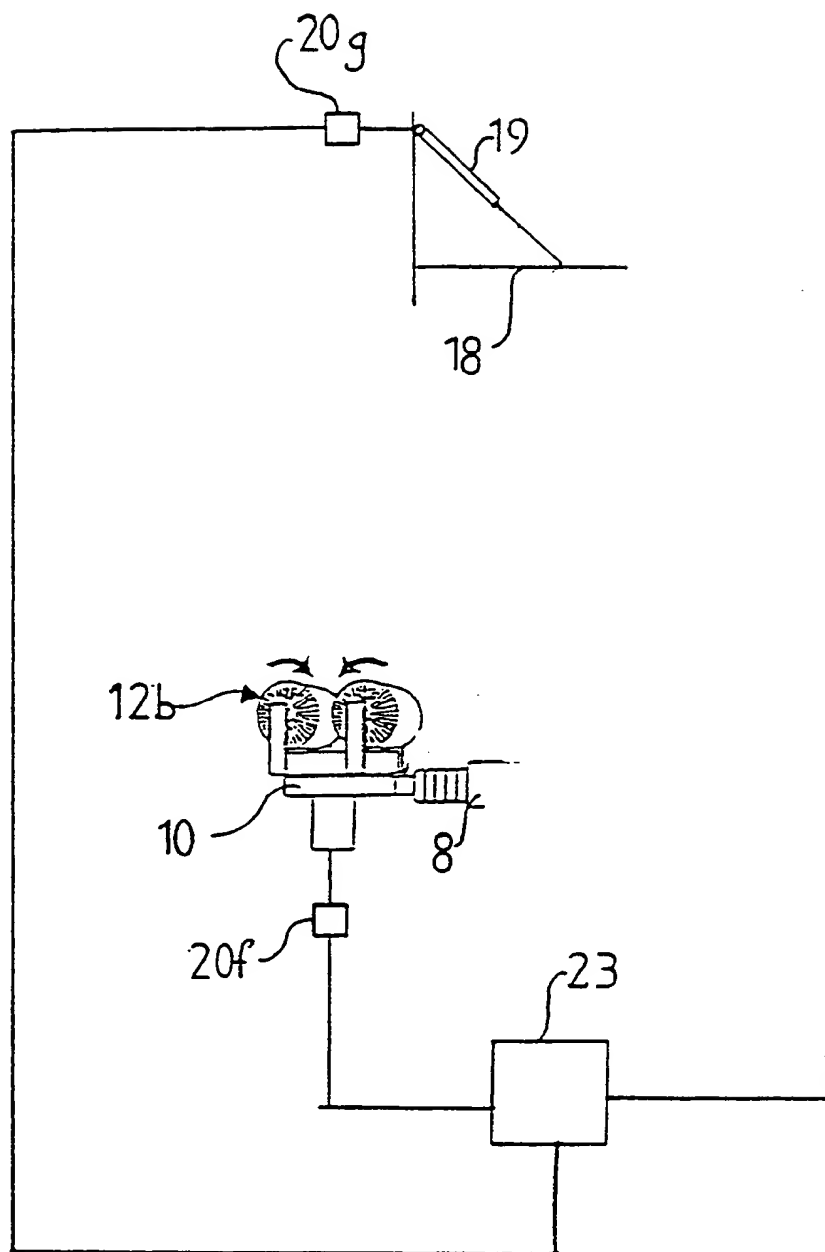


FIG. 3

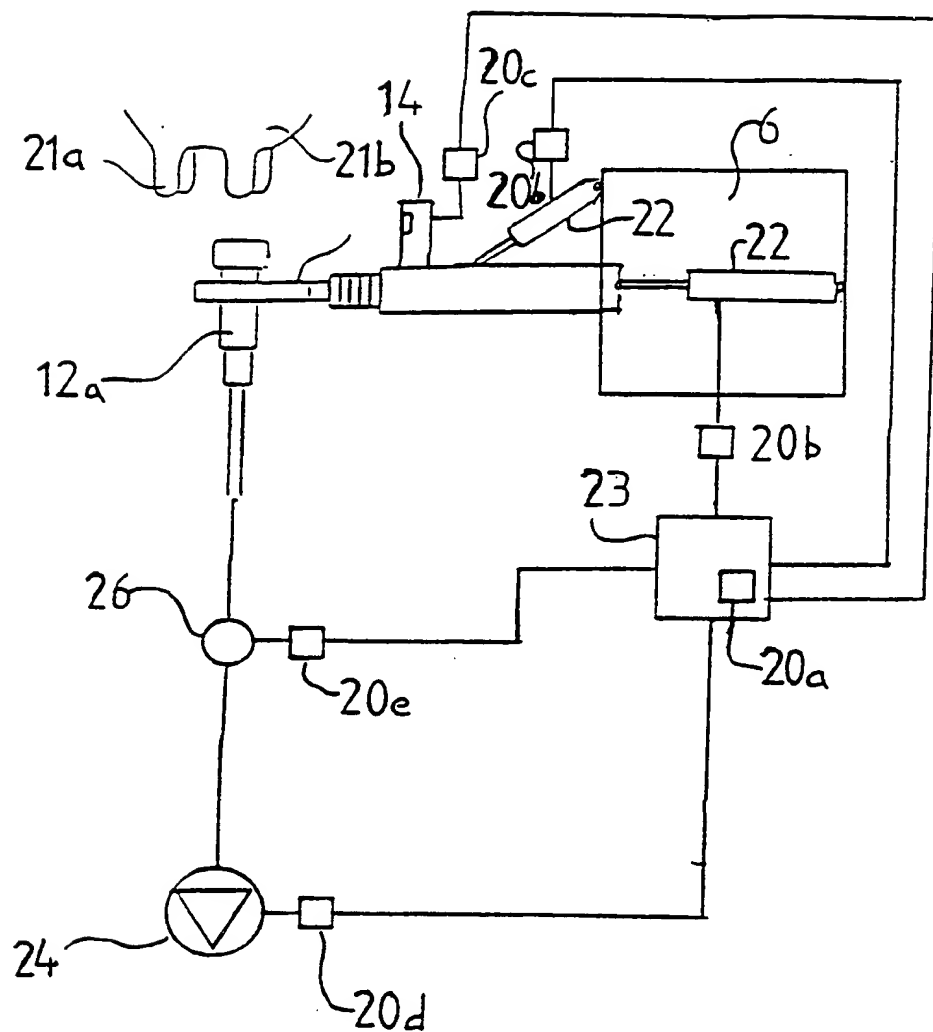


FIG. 2



## INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 98/02386

## A. CLASSIFICATION OF SUBJECT MATTER

IPC6: A01J 5/017, G07C 3/00

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: A01J, G01D, G07C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 9636212 A1 (TETRA LAVAL HOLDINGS & FINANCE S.A.), 21 November 1996 (21.11.96), page 3, line 11 - line 14	1
Y	--	2,3,6-8
Y	EP 0244642 A2 (CURTIS INSTRUMENTS, INC.), 11 November 1987 (11.11.87), column 1, line 1 - line 39	2,3
Y	CH 646254 A5 (APPLIED ELECTRONICS B.V.), 15 November 1984 (15.11.84)	6-8

☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

\* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

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"I" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&amp;" document member of the same patent family

Date of the actual completion of the international search

Date of mailing of the international search report

17 March 1999

21 -03- 1999

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## INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 98/02386

## C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	SE 353606 B (SMITH INDUSTRIES LTD.), 5 February 1973 (05.02.73)  --	
A	EP 0442383 A1 (STIRL, A. ET AL), 21 August 1991 (21.08.91)  --	
A	EP 0576086 A2 (C. VAN DER LELY N.V.), 29 December 1993 (29.12.93)  --	
A	Derwent's abstract, No 92-355505/43, week 9243, ABSTRACT OF SU, 1692420 (AGRIC ELECTRIF RES INST), 23 November 1991 (23.11.91)  -- -----	

**INTERNATIONAL SEARCH REPORT**  
Information on patent family members

02/03/99

International application No.  
PCT/SE 98/02386

Patent document cited in search report			Publication date	Patent family member(s)		Publication date
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				SE	505351 C	11/08/97
				SE	9501835 A	18/11/96
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				US	4712195 A	08/12/87
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EP	0442383	A1	21/08/91	NONE		
EP	0576086	A2	29/12/93	SE	0576086 T3	
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				AU	664282 B	09/11/95
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				NZ	247998 A	26/01/96
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				US	5842436 A	01/12/98

## Claims

1. An animal related apparatus, comprising a robot (6) for performing an animal related operation, said robot being associated with a control means (23), and at least one animal related device (12a, 12b) associated with said control means, said robot being provided with a robot arm (8) adapted to move said animal related device towards an animal, characterised in that

a registering means (20a, 20b, ... , 20g) is provided for registering a cumulative running value;

said control means being adapted to generate a signal when a predetermined threshold value has been reached; and wherein

said predetermined threshold value is set for each of said at least one animal related device, said robot and a complete animal related operation.

2. An apparatus according to claim 1, characterised in that

said registering means (20a, 20b, ... , 20g) is adapted to register the running value of said at least one animal related device.

3. An apparatus according to claim 1 or 2, characterised in that

said registering means (20a, 20b, ... , 20g) is adapted to register the running value of a driving means (22) of said robot (6).

4. An apparatus according to anyone of claims 1 to 3, characterised in that

said running value is the running time of said complete animal related operation.

5. An apparatus according to anyone of the preceding claims, characterised in that

said animal related device comprises milking equipment having a teat-cup (12a) provided with a shell and a liner forming an intermediate space;

said space being connectable to a source of vacuum (24) via a pulsator (26) for creating a pulsating vacuum,

said pulsator being associated with said control means (23), and

said control means being adapted to register the cumulative running value of said pulsator.

6. An apparatus according to claim 5, characterised in that  
said running value is running time of said pulsator (26).

7. An apparatus according to claim 5 or 6, characterised in that  
said running value is a number of pulsations generated by said pulsator (26).

8. An apparatus according to anyone of the preceding claims, characterised in that  
said animal related device comprises a teat location device (14) and  
said running value being running time thereof.

9. An apparatus according to anyone of the preceding claims, characterised in that  
said animal related device comprises a teat cleaning device (12b) and  
said running value being running time thereof.

10. An apparatus according to anyone of the preceding claims, characterised in that  
said apparatus further comprises a gate means (18) for restricting  
movement of an animal from an animal space (4);  
said gate means (18) being opened and closed by means of a driving  
means (19); and

said running value being said running time of said driving means.